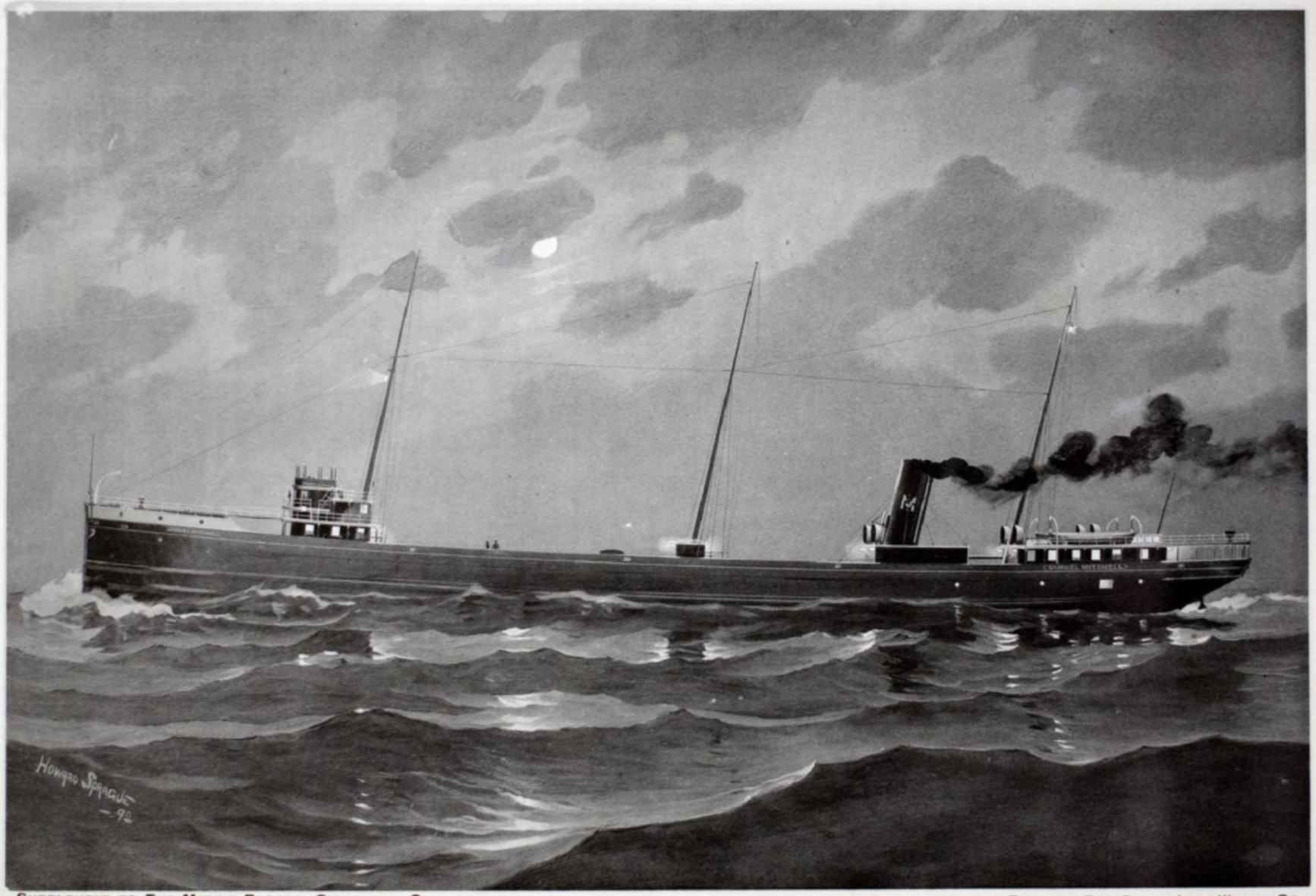
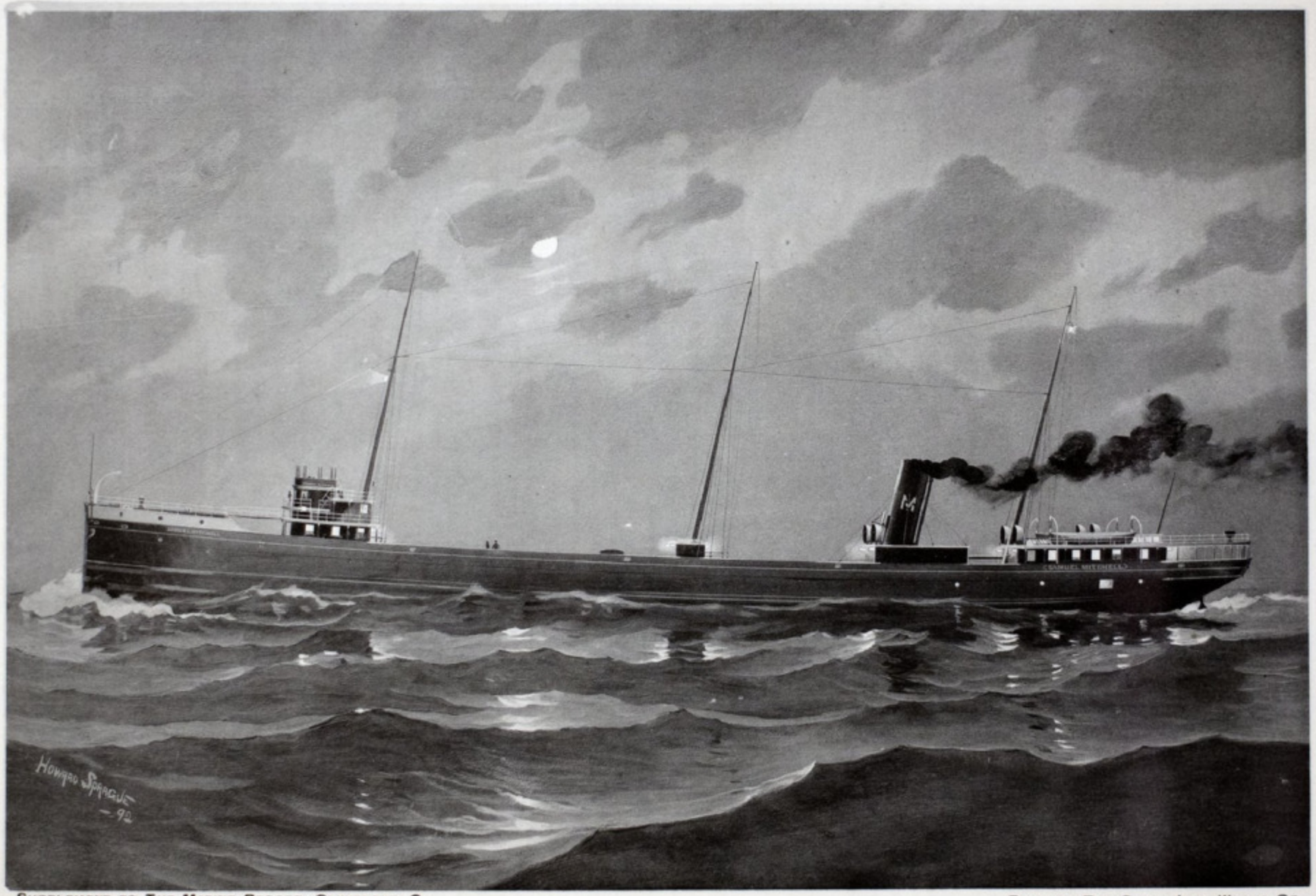


SUPPLEMENT TO THE MARINE RECORD, CLEVELAND, O.

BUILT BY THE GLOBE IRON WORKS CO.

STEEL STEAMER SAMUEL MITCHELL.



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ESTABLISHED 1878.

VOL. XV. CLEVELAND, OHIO, JULY 28, 1892. NO. 31

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

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CLEVELAND, O.

Captain Packer has been appointed to the schooner Minnehaha, recently purchased by the Johnson Line.

Mr. Russell, of the firm of Russell & Watson, lamp manufacturers, Buffalo, arrived in the city Wednesday night on business for his firm.

Mr. E. Platt Stratton, chief engineer, surveyor for the Record of American and Foreign Shipping, New York, is in the city to-day.

J. P. Brogan, the marine grocery man at the West Side, is now enjoying a well deserved patronage, his genial manner makes it at all times pleasant to do business with him.

Geo. Randerson & Son, who are well known to local vesselmen have about completed their new premises on Detroit St., and will keep on hand a larger stock of best quality fresh and salt meats than ever before.

Capt. Geo. McLeod visited this port last Saturday and disposed of the coal cargo sunk in the schooner General Burnside off this port for $300 to L. P. & J. A. Smith. Capt. McLeod made the sale in the interests of the underwriters.

The Lake Erie Boiler Works proprietors Keenan & Murphy have leased 130 feet front on Main street slip for a boiler and machine repair shop, by prompt attention to business they intend to merit a fair share of stationary and marine patronage.

Mr. Charles Groves, assistant superintendent of the Globe Iron Works Co., died on Wednesday morning after a brief illness. Mr. Groves was well known and highly respected by all with whom he came in contact, having been in the "Globe" from the time the yards were first established.

Evidence is now being collected regarding the temporary abandonment of the schooner H. P. Baldwin on Lake Michigan last November It appears that the crew pulled ashore to seek for assistance, and during their absence from the vessel the Booth Fishing Co. tugs boarded and towed her into Manistique. Unless the case is amicably settled the legal contest will be more than interesting.

Capt. Clary, of Sandusky, brought his handsome yacht Minx into this port last week, and as on previous occasions gave several of our prominent vesselmen a spin on the lake. Capt's Penney, C. E. Benham, J. W. Moore and Messrs. H. D. Coffinberry, R. R. Rhodes, and Judge L. H. Ware were of the party, a resolution upholding the prestige of "the saviour of Lake Erie" by the city was among the heroic and jovial discussions entered upon by the whilom "water ploughers."

The tug E. M. Peck has been entirely rebuilt, given a new iron boiler house and had her name changed by the Bureau of Navigation to C. E. Benham. She now makes a staunch and powerful river tug or a good all round wrecker and tow boat. Capt. Benham has been to a great expense to put this boat in service again and she is as sound now as the day she was launched. Capt. Emil Detless and Engineer Elmer Ennis are placed in charge.

Capt. Marsilliot has been engaged transporting four Brook's locomotives and 65 freight cars from L'Anse to the head of Huron Bay, where iron ore docks are being built for the Huron Bay & Iron Range Railroad. This railroad connects with the Chicago & Northwestern Railroad at Champion, Mich., and the company are nowreceiving specifications for a new freight steamer. Ore docks are now so well advanced that shipments will be made this season, and the country is more than rich in minerals. The new port is named Arvon, and will soon be quite a shipping port with every possible natural facility.

The steel steamers Pontiac and Western Reserve built by the Cleveland Ship Building Co., are earning untold favors all around. The work of the first named steamer for the month of June aggregated nearly 15,000 tons of ore from Lake Superior to Ohio ports, and the latter has just brought down from Escanaba 3.717 net tons of ore, thus gaining the broom for the largest cargo through the rivers. Her owner, Capt. Philip Minch, only asks for a better draft of water to discount even this unusually large cargo.

Judge Ricks has just returned from a trip over the upper lakes taken with Capt. Swartwood in the propeller J. H. Wade. The judge expresses himself as being more than pleased with the courtesies extended to him and the valuable experience gained in his cruise, thus giving him a much better idea of the crowded state of the rivers during the busy season of navigation than he had heretofore realized, and placing him in a better position to render a decision in the closely contested admiralty suits which come before him. The judge had also a taste of heavy weather, as Capt. Swartwood kept her at it when some steamers were seeking shelter.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

Friday morning last the tug Commodore Jack Barry took fire in one of the Illinois Central slips. The fireboat Yosemite was quickly on the spot and did what was necessary to keep the tug intact. The damage is estimated at $600.

The O. S. Richardson Fueling Co., have put in an excellent electric light plant at their dock at Central Slip C., coaling can be done as well nights as days, they put 100 tons of hard coal on board the U. S. S. Michigan with their Spring Heel Jack derrick in the inner harbor last week. Spring Heek Jack and his crew were treated elegantly and given an excellent repast by the officers of the Michigan.

Jacob Hansen is building for Eugene Spear a standing keel cutter yacht 30 feet over all, 6 feet, 6 inches beam, 4 feet 6 inches hold. She is well and strongly built and of handsome model and will be launched in August.

Miller Bros., shipbuilders, are building a fire boat for the World's Fair, her dimensions are 70 feet over all, 16 feet beam, 6 feet hold. She is partly in frame.

Captain James Channon returned Thursday from a trip to Ogdensburg and Oswego on the steamer Rhoda Emily. Captain Jimmy had a very enjoyable trip and is so thoroughly bronzed that he looks like an old sailor again.

The body of Oakley Joyse, the young sailor who lost his life by falling overboard from the steamboat T. D. Stinson on the 9th of July, was picked up off Chicago on the 19th by the tug Welcome of the Independent Tug Line and taken to the life saving station. The body was taken to the morgue, an inquest was held and a verdict of accidental drowning was returned by the jury. Captain George Tebo, president of Chicago E. M. B. A. took charge of the body and sent it in a metallic coffin to the deceased's father Captain John Joyse, at Bronte, Canada.

The Graham & Morton C o.'s splendid passenger steamer Chicora is expected to leave the Detroit Dry Dock Co.'s shipyard on Saturday for St. Joseph. She will commence running excursions out of Chicago Saturday August 6th in conjunction with the company's splendid steel side wheel steamer City of Chicago.

Tuesday grain freights were steady at 2¼ cents on wheat, 2 cents on corn to Buffalo.

The inspection papers of the steamers Delaware and Wilbur at this port will run out August 4th.

Captain D. W. Barnes, of the schooner John Wesley, experienced some rather rough usage on his last trip from Manistee to South Chicago with salt. When off Grosse Point Sunday afternoon the schooner was struck by a squall and carried everything away. Captain Barnes saw the squall approaching and had taken in the mizen and light sails and double reefed the fore and main sails, a miniature whirlwind preceded the heavy squall which lasted about an hour. The schooner arrived at South Chicago and when towed up the Calumet river, Monday morning those on board were assailed by a shower of iron ore slack thrown at them by a walking delegate of the Chicago Seamens Union. One piece of the slack whizzed by the head of the mate who was standing amidships, another piece nearly struck the wheelsman while another went through an awning made of No. 4 canvas and the wire screen in the galley window, fortunately no one was injured. Captain Barnes went as soon as possible to Hyde Park police station and got out a warrant for union seamen delegate Miller, who was arrested during the afternoon and was identified by Captain Barnes and the bridge tender in the evening. His case came on Tuesday morning and he asked for a continuance until Wednesday morning which was granted, he is held in custody. The John Wesley carries, Lake Carriers' Association sailors hence the trouble. Why do not the Lake Carriers' Association act if they wish to keep up their shipping offices, during the present month mate Robert J. Walker was murdered at this port in the cause of their Association and now another outrage is committed and awaits the Associations' action. If the Association had offered a large reward for the capture of mate Walkers murderer it is probable and even possible that he would have been captured and the second outrage now recorded would never have been committed. Firm and heroic measures to preserve the peace should be insisted on.

The event of the week in marine circles will be the arrival of the Codorus, the first of the three Anchor Line "straight-backs" going into service this month. The Codorus is due about Friday, and will then be inspected, Agent J. C. Evans being the host. Already the jealousy of the three ship building towns of Detroit, Cleveland and Buffalo, at each of which the Anchor Line had a "straight-back" built this season, is becoming evident. Buffalo papers are claiming that the Codorus is by

(Concluded on page nine.)

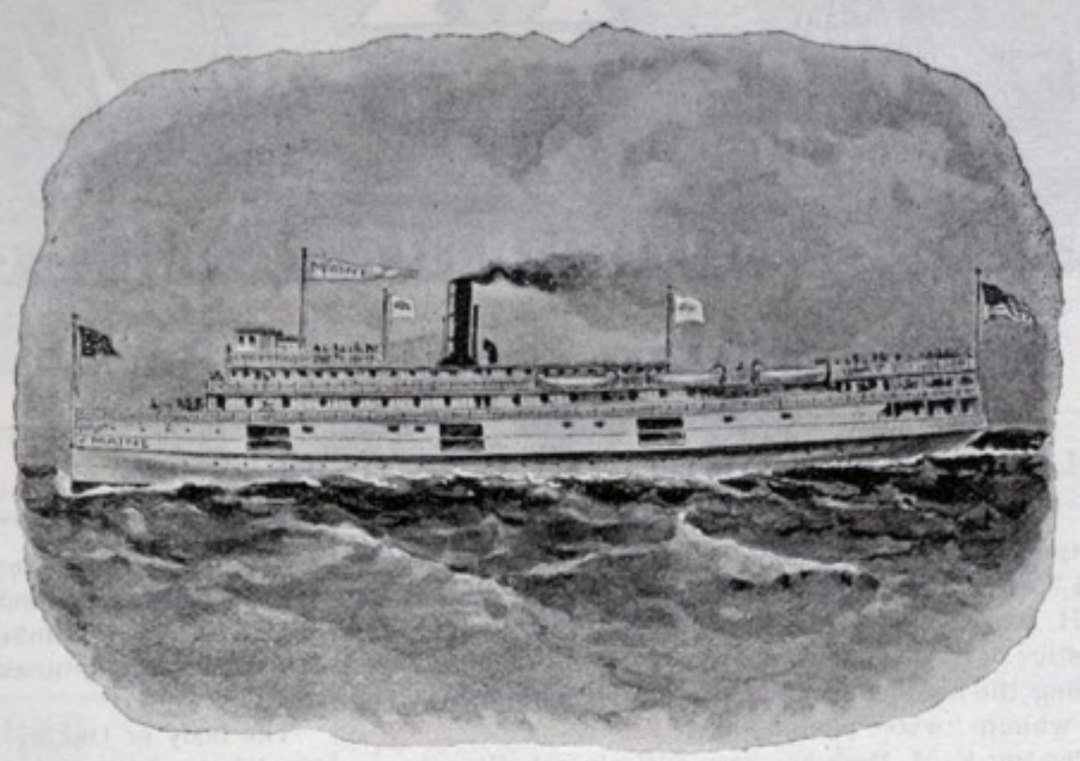
A LINE OF PASSENGER STEAMERS.

Anent the rumor that the Great Northern Line intend to build two large passenger steamers for the route between Buffalo and W. Superior, it will no doubt be of interest to our readers to view the plan of saloons and the hull of one of the Providence and Stonington Steamship Co.'s fleet of passenger steamers.

The views given of the saloons, dining room and cafe are those of the New Hampshire, and the hull is that of the Maine, both steamers being the latest additions to the fleet controlled by the Providence and Stonington Co., who probably carry more passengers than any other line in the United States.

In the Maine and New Hampshire the company has been the first to make the change on the waters of Long Island Sound from the side-wheel steamer to that of the propeller. Three other and lesser lines have now followed suit, and it is expected that hereafter very few paddle steamers will be built for the larger of the Sound lines.

The Maine and New Hampshire are twin steamers built by the Harlan & Hollingsworth Co., at Wilmington, Del., the former having been launched on October 31, 1891, and the latter January 16, 1892. Embodying the best results obtainable from the shipbuilder's art, they offer the most splendid as well as the most comfortable accommodations for passengers combined with the maximum of speed and perfect safety. They are screw steamers, each 310 feet, over all; 302 feet 7 inches on water line, beam molded on load water, 44 feet; over guards, 60 feet; draft, 12½ feet, and are built of steel, the hull being divided into seven water tight bulkheads. Their engines are of the inverted, direct-acting, surface-condensing, triple-expansion type, with four cylinders, 28, 45, 51 and 51 inches diameter, with 42 inch stroke. The propeller is of cast-iron, left-handed, four-bladed, and 13½ feet in diameter. Steam is supplied by four Scotch boilers in each vessel. They are 13 feet 6 inches in diameter, and 11 feet 6 inches long, and made of steel having a tensile strength of 60,000 pounds to the square inch. Each boiler has three corrugated furnaces, 46 inches outside diameter, comprising 274 square feet of grate surface. They are lighted by electricity, and steered by steam. The speed of either vessel is 20 miles an hour. Their accommodation for passengers is replete with every comfort and confidence.



THE MAINE.

The passenger gangway is well aft, on a polished oak floor, surrounded by painted and gilded panels, panels of rich dark wood in natural finish, clear plate glass and mirrors. The passageways and front of berths in the ladies' cabin are hung

DINING ROOM.

with cretonne, having a white ground sprinkled with flowers in natural colors. The grand stairway is ten feet wide, with newel posts that rise into white turned columns, with carved capitals, which support the deck of the grand saloon. Around each column clings a vine in bronze, supporting six incandescent electric lamps. Rising on each side is a heavy balustrade and hand-rail, and beyond are the gilded panels, frosted glass lights, and the curved and gilded carlins of the arched ceiling.

CAFE.

The grand saloon lies forward and aft of the grand stairway in about equal dimensions. The machinery space, inclosed by rich paneling, covered with gilded flowers in relief, breaks the view forward, but to the rear is a great room, wide, long and lofty. The mural decoration is in white, with gold relief in flowers and moldings, the walls are the outside paneing of two rows of luxuriantly fitted and furnished staterooms. The ceiling springs over these walls from beyond the edge of the paneling and over long lines of gilded moldings.

The deck is covered with the softest of carpets, and the furniture is upholstered in silk plush—old rose-colored on the Maine, silver-sage on the New Hampshire. This saloon is 243 feet long, about 20 feet wide, and lies under an arched ceiling or roof about 15 feet high. The after end of the saloon is curved. Around it is a seat of silk plush, and above it hang silken curtains. The forward end of the saloon is occupied by two parlor staterooms furnished in harmony with the soft colors of the saloon, and having polished brass bedsteads. The forward walls of these staterooms are curved and pierced with windows, which, with the other entrances, are hung with old rose colored silk curtains. The panels of the side walls of the saloon are long—the length of stateroom—and wide. The ornamentation is in wreaths and flowers, with bows of flowing ribbons. These are very delicately expressed. They are in such fine lines and so open that they enhance the apparent great length, width and height of the saloon. The artistic effect is that of a very large, perfectly proportioned and harmoniously decorated and furnished apartment. The details, however, are so perfect that no part of it loses its attractiveness by critical examination.

The dimensions of three others of these famous steamers are as follows:

Massachusetts. Built 1876, at Greenpoint, L. I.; wooden hull; length, 323 feet; beam, 42 feet; depth of hold, 15.9 feet; feet; 2,607 gross and 2,171 net tons. Rhode Island. Built, 1882, at Noank, Conn. Wooden hull, 332 feet in length; 46 feet beam, 16.4 feet depth of hold; 2,888 gross and 2,387 net

MAIN SALOON,

tons, and the Connecticut, built 1889, at Noank, Conn. Wooden hull, 345 feet in length; 48 feet beam, and 18 feet depth of hold She is 3,399 gross and 1,872 net tons. Side-wheel steamer.

The Providence & Stonington Steamship Co. was formed in 1875 by the consolidation of the old Stonington Steamboat Co. with the still older Providence & New York Steamship Co., which was the name at that time of the line which under one name or another has maintained a service of steamers between New York and Providence, with some slight interruptions, from the earliest beginning of steam navigation on Long Sound up to the present time.—[From "Seaboard," New York.

BETTER PAY FOR THE LIFE SAVERS.

Congressman O'Neil, of Missouri, who had charge of the bill to increase the pay of the keepers and crews of the life saving stations, has received a number of telegrams of congratulations from the grateful life savers. He worked hard for the bill, which has been buffeted around congress for 12 years. The bill will make it much easier to keep life saving crews in the service on the lakes in the worst season of the year. It will also enable the superintendent to get good men with which to manage new stations, and is an increase of pay to a worthy class of men.

The pay of keepers of life-saving station is raised from $600 to $900 per year and of surfmen from $50 to $65 a month. The bill will undoubtedly be signed by the President.

THE RESISTANCE OF SHIPS.

CLEVELAND, O., July 20, 1892.

To the Editor of the Marine Record.

I am obliged to you for showing me Mr. H. C. Pearson's letter, dated July 15, on my return home, with reference to my paper entitled "Screw Propulsion," (the first portion only of which has yet been published for want of space in your valuable journal). I have not attempted to formulate a rule or to construct a formula applicable to different classes of steamers and I am not likely to attempt anything so heroic for print. My remarks were strictly limited to ordinary cargo steamers, indeed to our ordinary lake cargo steamers of moderate speed and for such steamers where the speed does not exceed 10 knots per hour, I repeat that the horse power required may be based either on the displacement or wetted surface.

In cylindrical vessels whereas the surface augments as the diameter, the capacity or "displacement" increases as the square of the diameter. For instance if one vessel of 20 feet diameter and 200 feet in length be substituted for two vessels each of 10 feet diameter and 200 feet in length, the surface will be the same, but the capacity will be doubled.

Assume two prisms of rectangular section, call the one 10 x 20 x 10, and the other 50 x 10 x 5, immerse each just to its depth or smallest dimension, then while the wetted surface of one is but four times that of the other its displacement is eight times as much; but the principal dimensions of ordinary cargo steamers do not vary in any such ratio. Two dimensions remain about constant, viz.: Draft of water, which is practically constant, and breadth of beam, which is at least proportionately so.

But to come back to such vessels as I had in mind, and actually mentioned. Let me compare two lake cargo steamers of very different dimensions, say one is 290 x 40 and at about 16 feet mean draft of water displaces 4,700 tons, her wetted skin by the approximate rule I gave is 18,792 square feet at the same draft of water. Now compare this steamer with our largest lake steamer, the principal dimensions of which are 244 x 42. The displacement of this steamer at the same draft of water as the above will be 5,700 tons her wetted skin at the same draft of water will equal to 22,910 square feet. Now for a ten knot speed the indicated horse power required for the small steamer, by wetted skin would be 1,253, by displacement also 1,253. For the larger steamer the indicated horse power by wetted skin would be 1,527, by displacement 1,520, difference nearly one-half per cent. So the error of this approximate rule when applied to steamers in which the difference in displacement is one thousand tons is not more than one-half per cent. Of course the discrepancy will seldom be so small as this, though in practice I take the mean of these quotients, so the error will never be vital when used as above limited.

In quoting a rule for ascertaining the approximate indicated horse power required for the limited speeds attained in our cargo steamers I may at once inform your correspondent that this formula is altogether too tentative for ships of high speed. When such are being designed, not only are displacement and wetted surface both potent factors in such calculations, but length must be considered an essential element.

The resistance of the water acts in two ways, the ship in moving forward has to displace a certain mass of water equal in weight to the ship and all that is therein, the work done in this way is measurable by the weight of water, hence displacement becomes a factor in the calculations, though for low speeds the surface frictional resistance frequently amounts to 80 or 90 per cent. of the total resistance and for high speeds such resistance is seldom less than 50 per cent.

For instance, if the large vessel I have quoted was required to "steam" 16½ knots instead of 10 knots—or rather a steamer of such general dimensions, for that vessel as constructed could not be propelled at any such speed—she would require for economical steaming a length of entrance of 109 feet and an angle not greater than 10° and 13.9 as Rankine's mean depth, such a model could be propelled 19 miles per hour with 4,900 indicated horse power. If shorter lengths or more obtuse angles were adopted, larger boilers would be required, more weight would have to be carried and the vessels dead-weight ability would be reduced in a proportionate degree. If the lengths of entrance and run are not suitably adjusted to the maximum speed of the ship, a certain portion of the waves which are formed by the ship diverge from her path, carrying off from the water in motion the forward energy impressed upon them.

In conclusion I may add that it is quite possible to increase the displacement—and moreover augment the resistance—of a high speed steamer whilst reducing her wetted skin.

On the other hand the wetted skin may be increased through a reduction of displacement and yet augmented resistance result. It is just here where some advance may have been made in the science of naval architecture in modern times.

The practice of shipbuilders certainly has advanced, resulting in vastly more economical steamers and it may be that no where is this progress so marked as on these lakes.

A DRAFT of 14 feet 7 inches is now being brought through St. Mary's Falls Canal thus showing a steady gradual rise.

Maritime Law.

A wharfingers liabitities seem to be clearly set forth in the two following recent decisions. The digest of the case cited relative to a weak shaft is also of direct importance to vessel owners.

District Court, D., Massachusetts. May 30, 1892.

WHARVES AND WHARFINGERS—OBSTRUCTIONS—LIABILITY OF WHARFINGERS.

A schooner drawing 11 feet 8 inches, loaded with coal owned by and consigned to the respondents under a bill of lading guarantying to her generally 12 feet of water, arrived at respondents' dock. One of the respondents was present at the schooner's arrival, but said nothing to the master. The latter was unacquainted with the obstructions and the tides at the place. The schooner struck a ledge of rock on which at average tides the water was 12 feet deep. Respondents did not own the bed of the river, but dredged it, and occupied and used the wharf to berth vessels. Held, that the master had a right to rely on the respondent who was present, and his silence amounted to an express invitation to enter. Held, therefore, that respondents were liable.

Circuit Court of Appeals, Second Circuit. Feb. 16, 1892.

WHARVES AND WHARFINGERS—OBSTRUCTION—KNOWLEDGE LIABILITY.

Libelant's steamer was berthed at respondent's wharf, alongside of which lay a sunken wreck. The presence of the wreck was known both to respondent's agent and to the agent of libelant. who applied for the berth. There was no understanding, express or implied, relieving the respondent from the ordinary obligations of a wharfinger, except the implied obligation on the steamer to go to the particular berth assigned. Respondent's agent saw the steamer at the wharf discharging but made no objection to the berth. The steamer was afterwards injured by the sunken wreck, and sank in the slip. Held, that the steamer's agent was justified in assuming that respondent's agent had better information than he had as to the condition of respondent's premises, and in relying and acting upon such assumption; and that as a wharfinger, in offering accommodations for hire, the respondent impliedly agreed that the steamer would not be exposed to danger arising from concealed obstructions known to its agent, and which the steamer was not required to anticipate: that respondent therefore was liable for the injury done the steamer.

District Court, D., Massachusetts. August 15, 1888.

SHIPPING—UNSEAWORTHY VESSEL—WEAK SHAFT.

Where a steamer's propeller shaft, which had been long in use, broke in fair weather, when the ship was under ordinary full speed, and no wreckage lay about or rock that could have been struck, and the shaft showed no flaw subsequent examination, the court found that the shaft was weak befor the vessel left port, and held, that this constituted such a defect as to render the ship unseaworthy at the commencement of her voyage, and her owner liable for damages arising out of such condition. Fed. Rep., Vol: 50, page 567.

THOSE CANAL TOLLS.

Special Correspondence to The Marine Record.

TORONTO, CANADA.—A government official at Ottawa of some power, whose advice is always sought by the administration regarding questions affecting the waterways in controversy between Canada and the United States gives it as his opinion that sooner or later it will be recognized that American policy is far broader than mere rectification of canal tolls. Their object, this official gentlemen vouchsafes, comprehends the ultimate right of navigating not simply the Welland canal but the complete St. Lawrence system by United States craft on a perfect equality with British ships and under an unlimited guarantee. The United States idea is demonstrated in a report of the Congressional committee on interstate and foreign commerce presented by Mr. Lind to the House of Representatives last spring. It is there pointed out that the shortest and cheapest route of communication between the Great Lakes and the sea is the St. Lawrence one, with its canals deepened to a depth uniform with that of the "Soo" canal. It is palpable, according to the official Canadian view, that American diplomacy contemplates the possibility thus opened up of the magnificent fleet of the United States inland marine sailing direct from Chicago to Liverpool or any other port in the world. Access to the sea would also enable the modern large lake vessels to avoid the loss of laying up all winter, for they could be employed on the Atlantic in voyages to South American countries, returning to the profitable lake trade in the spring. So much has been said regarding the tolls on grain eastwardbound, that it will be interesting to see just what quantities went to Ogdensburg, N. Y., last year of cereals passing through the Welland. The figures for the season of 1891 are as follows: Corn 119,198 tons; oats 52,823; wheat 18,204; or a total of 190,225 tons of grain going via the Welland to Ogdensburg, the discriminatory duty upon which would amount says a dispatch from Ottawa to the Globe, according to the official returns, which will shortly be published, to $34,489. Of this sum about $3,000 would represent the discrimination in favor of the port of Kingston, a quantity of 17,817 tons having been transhipped at Ogdensburg for Montreal. If the rebate of this small sum had been conceeded to the port of Ogdensburg the broad claim now made by the American Government would probably have been postponed indefinitely, to the diplomatic advantage of Canada. The total quantity of grain passing through the Welland for Canadian ports was last year 291,217 tons an over 1890 of 46,000 tons.

Communications are passing between the Canadian and the American Governments through the channel of the British Legation at Washington with the view to the issue of simultaneous proclamations bringing into force the new law passed by each legislature providing for reciprocity in wrecking and towing in waters contiguous to each country. The act of Congress has yet to receive the President's signature and contains, as the act of the Canadian parliament does, a clause suspending it until brought into effect by proclamation.

The new Dominion revenue cutter Curlew called in port on her way down from the Polson shipyard at Owen Sound, to Quebec, and was inspected by many visitors. She is a sister ship to the cutter Constance, which went down to the Gulf of St. Lawrence this spring, and the latter's exact counterpart as nearly as possible, the cruiser will carry a crew of 17 men. To starboard and port of the boilers the coal bunkers are built to act as buffers, a protection to the machinery in case of her being fired into. Naval equipment, ammunition and stores will be shipped at Quebec and the Curlew will then chase smugglers in the Bay of Fundy. J. A. C.

AN UNJUST COMPARISON.

Mr. John F. Pankhurst, general manager of the Globe Iron Works Co., is somewhat indignant over figures recently published in a New York contemporary, which he says are entirely misleading. To THE MARINE RECORD man he said: "I desire to be correctly quoted on this subject and am pleased to furnish you the exact figures in question.

The New York paper stated "that the Matoa of the Minnesota Steamship Line, and the "whaleback" Colby Hoyt made each four round trips last year for the purpose of comparison. The trips were made and cargo discharged in 28 days by each vessel. The Hoyt, it is said, carried 8,660 tons, and the Matoa 8,500 tons in that period. The Hoyt burned an average of 122 tons of coal per trip, and the Matoa 178 tons and 300 pounds. The bills for the Hoyt's engine supplies were $23.46 and Matoa $48.78."

This report so favorable to the whaleback is eminently misleading and quite at variance with the facts as shown by the comparative tests. The figures seem to be given with a spirit of fairness and candor sufficient to convince the uninitiated, and I feel it to be my duty to correct this wrong impression.

When the Minnesota Steamship Co. desired to add to their fleet, tests were made for the purpose of deciding whether the whaleback type would answer their purpose any better than the usual construction, and after these tests were made an order was placed with the Globe Iron Works Co., and the Chicago Shipbuilding Co. for each to build a ship on the same lines as their present fleet, only somewhat larger.

This ought surely to have sufficed even if not satisfactory to some interested parties, without rushing into print on the comparative tests and mis quoting figures to bolster up erroneous assertions. I have taken some pains to secure the correct showing of these test trips and find that the Hoyt's time for four round trips was 34½ days while the Matoa covered the same distance in 28.67-100 days. The Hoyt carried 8,438 tons, and the Matoa 8,732, mean, draft of water of the Hoyt was 14 feet 5 inches, and of the Matoa 14 feet 3 inches, consumption of coal, Hoyt 134½ tons, Matoa 187 tons, speed of Hoyt 11.45 miles per hour, Matoa 12 69, engine supplies, Hoyt $13.50, Matoa's $12.88. These figures you see are different from those quoted by the New York paper, and when you consider that the Matoa is a much larger vessel, was handicapped by such low water at the "Soo" canal as only to be able to carry about two-thirds of a cargo on the limited draft allowed, yet, she carried nearly 300 tons more cargo at a speed of 1¼ miles in excess of her competitor during the test trips. Anyone acquainted with the power required to propel ships will realize what a mile and a quarter extra speed means.

I like honest criticism and fair competition, but have not a particle of use for erroneous statements, or inaccurate figures when quoted to assist wrong impressions."

DREDGING WORK AT THE "SOO," THE PATROL SYSTEM CONTINUED.

Special Correspondence to The Marine Record.

Dunbar & Sullivan, Sault Ste. Marie, Mich., have put one drill at work on the excavation of 300,000 yards of rock in the canal this week, a channel twenty-four feet deep will be dredged, work will commence on the north side of canal, and it will be well for wooden vessels not to lay near the dredges while blasting is going on, as it is very liable to shake the oakum out of their seams. The drill will have a green and red light displayed at night. The same firm have six dredges at work on the Hay Lake channel, and from present indications will certainly have their contract completed in the fall of 1893. There are150 men employed on the work. The firm of Dunbar & Sullivan have justly acquired the reputation of having the best organized and most systematic force of dredge men on the Great Lakes.

Hughes Bros. & Bangs are pushing their work on the new lock and have about four hundred men employed. They will have their contract completed on time and have every modern improvement to facilitate their large contract.

P. M. Church has received instructions to continue the patrol service on the river until further notice. This is a very important service to vesselmen, and it would certainly mean loss to them by vessels grounding if the patrol work which has been so well performed were to be discontinued. It is probable that The Pioneer will continue the patrol for the balance of the season. HARVEY'S MARINE BUREAU.

THE ASHTON VALVE COMPANY.

The Ashton Valve Co., 271 Franklin street, Boston, Mass., have bought the entire plant, material and business of the Boston Steam Guage Co., together with a series of valuable patents, and have consolidated the latter business with their own. They have secured the services of the former manager of the Boston Steam Gauge Co., H. L. Willard, long and favorably known to the trade, and bespeak for him the same consideration in this new connection that has been so generously extended to him in the past. The Ashton Valve Co., will manufacture all classes of steam pressure and vacuum gauges, hydraulic gauges, water pressure and ammonia gauges and all similar instruments used in connection with steam plants, more particularly the sole manufacturers of the Boston patent steam gauge. The reputation gained by nearly twenty years' experience in the manufacture of safety valves, and the widely recognized quality of the product of the Ashton Valve Co. will be the only guarantee needed for the unsurpassed quality of the goods they will put upon the market.

LLOYD'S REGISTER SHIPBUILDING RETURNS

FOR THE QUARTER ENDING JUNE 30, 1892.

From the returns compiled by "Lloyd's Register of Shipping," it appears that, excluding warships, there were 447 vessels of 778,462 tons gross under construction in the United Kingdom at the close of the quarter ended 30th June, 1892, compared with 530 vessels of 769,300 gross tonnage on June 30th, 1891. Of these there were 328 steamers of 631,222 gross tons, and 119 sailing vessels of 147,240 gross tons. The steamers were divided into 281 steel, 40 iron, and 7 wood and composite, while the sailing vessels there were 84 steel, 5 iron, and 30 wood and composite. Comparing the present returns with those of the quarter ended 31st March, 1892, a decrease is observed in the tonnage of vessels under construction of nearly 65,000 tons. This decrease has taken place chiefly in respect of sailing tonnage, which, however, remains at the high proportion of nearly 19 per cent. of the work in hand. Considerably more than half the sailing tonnage (or over 80,000 tons) is being built on the Clyde; about a quarter is distributed between the districts of Belfast, Leith, and Liverpool, leaving only about 30,000 tons under construction at all the remaining shipbuilding ports of the United Kingdom. It is remarkable that, of the very large total of 433,000 tons which is under construction on the north-east coast, the sailing tonnage only amounts to about 10,500 tons, or under 2½ per cent. A very considerable falling off from last quarter's figures is observed in the returns of vessels for the construction of which preparations are being made. At the end of March, 1892, there were reported 118 vessels of 223,276 tons as "preparing;" the present returns show 77 vessels of 123,249 tons, or not much over one-half of the previous tonnage. In fact, the tonnage preparing is now less than it has been at any date since June, 1890. With the exception of that time, so low a figure as the present has not been touched since September, 1887. The vessels now preparing are divided between steam and sailing vessels, as follows: Steamers, 51, 92,964 gross tonnage; sail, 26, 30,285 gross tonnage. The high proportion of sailing vessels which has prevailed of late is more than maintained, it will be seen in the vessels which are about to be put in hand.

During the quarter ended 30th June, 1892, there were commenced 117 steamers of 175,695 gross tonnage, and 40 sailing vessels of 44,465 gross tonnage, and there were launched 123 steamers of 164,409 gross tonnage, and 51 sailing vessels of 82,267 gross tonnage.

Of the 447 vessels under construction, 232 steamers of 489,122 gross tonnage, and 89 sailing vessels of 124,157 gross tonnage, are for the United Kingdom, this being about three-fourths of the whole. The British Colonies are taking six steamers of 13,490 gross tonnage, and one sailing vessel of 2,000 gross tonnage, while Australia is having built 12 steamers of 23,703 gross tonnage. There are also two steamers under construction for the United States the gross tonnage being 5,500, and two steamers for Russia with a gross tonnage of 9,500. Three sailing vessels are being built for Germany of a gross tonnage of 4,900, and three for Norway, the gross tonnage being 4,560.

Classified according to tonnage the returns give the following figures:—Under 200 tons, 70 steam 41 sail; 200 to 499 tons; 36 steam 9 sail; 500 to 999 tons, 27 steam 2 sail; 1,000 to 1,999 tons, 41 steam 33 sail; 2,000 to 2,999 tons, 64 steam 28 sail; 3,000 to 3,999 tons, 53 steam, 6 sail; 4,000 to 4,999 tons, 22 steam; 5,000 to 9,999 tons, 11 steam, and 10,000 tons and steam.

The various shipbuilding centres have vessels under construction, as follows: Belfast and Londonderry, 13 steamers of 55,824 gross tonnage and 7 sailing vessels of 9,358 gross tonnage; Clyde, 76 steam of 114,659 and 41 sailing vessels of 82,073 gross tonnage; Mersey, 6 steamers of 7,282 and 8 sailing vessels of 15,030 gross tonnage; Tyne, 63 steamers of 138,601 and 1 sailing vessel of 3,220 gross tonnage; Wear, 45 steamers of 125,139, and 4 sailing vessels of 7,282 gross tonnage.

NOTICE TO MARINERS.

Notice is hereby given that a small shoal, gravel and boulders have been found 900 yards west ⅝ south of the Waugoshance 18 foot shoal buoy, the least depth of water over this shoal is 15 feet 10 inches. A second class nun boy painted black has been placed in 23 feet of water, 15 yards northwest of the shoal. The position of the buoy is as follows: Waugoshance light house S. S. E. 1½ miles, St. Helena lighthouse E. N. E., ½ E., 12¼ miles, White Shoal light vessel N. N. W. 2½ miles, Gray's Reef light vessel W. S. W. ¼ W. 3⅞ miles.

The buoy is on a line between Waugoshance lighthouse and White Shoal light vessel, and nearly on a line between St. Helena lighthouse and Gray's Reef light vessel. These ranges should be useful in turning this buoy at night. The red and black nun buoy on the 18 foot shoal has been removed.

By order of the Lighthouse Board, Commander Nicoll Ludlow, U. S. N., Inspector 9th. Lighthouse District.

STANDARD TECHNICAL BOOKS.

	Regular Retail Price.	With The Marine Record one Year.
Beeson's Inland Marine Guide	$1.00	$2.50
Law of Bills of Lading	5.00	6.50
Patterson's Nautical Dictionary	5.00	6.50
Drawing & Rough Sketching for Engineers by James Donaldson	2.50	4.00
Scott's Coast Pilot (new edition)	1.50	3.50
Simple Elements of Navigation	2.00	3.50
"Wrinkles" in Practical Navigation	6.00	7.50
Practical Seamanship	7.50	8.00
Thurston's Manual of the Steam Engine, part 1	7.50	9.00
Thurston's Manual of the Steam Engine, part 2	7.50	9.00

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ESTABLISHED 1878.

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Rates given on application.

CLEVELAND, O., JULY 28, 1892.

AFTER a careful inquiry into the causes which led to the stranding of the Atlantic liner City of Chicago, the navigating officer has been severely censured for careless navigation and his license suspended for nine months.

THE loss of the schooner Gulnair off Ashtabula last week, and the sufferings which the crew of eight men experienced while hanging to the rigging of the sunken craft for four hours calls loudly for the establishment of a life saving station at the Harbor. Had this casualty occurred in the fall it is questionable if any of the crew had been left "to tell the tale." Quoting the words of Capt. D. P. Dobbins, the well-known superintendent of the district, "A station pays for itself by the rescue of only one life, but the record shows that scores of lives are saved every year by each crew, not to mention the amount of property salved.

IT would seem as if the Dominion authorities were too slow to perceive the earnestness with which the United States pursued the canal tolls question and by their apparent neglect have forfeited the right of way to reach Lake Superior. It is not to be expected that retaliatory measures will stop at this point however, and further action will but drift the subject farther away from an equitable adjustment. Direct and positive mutual concessions ought to be made, and the whole question placed on a basis that would facilitate future commerce. A measure of reciprocal courtesies between the Welland and St. Mary's Falls Canal would probably end the controversy and allay all undesirable friction.

THE steamboat inspectors of Buffalo believe that star chamber sessions are in order when inquiring into the causes which led to the sinking of a passenger steamer. It is probable that a secret investigation regarding the causes of a public calamity might develop new evidence, but, there is no possible reason why the voluntary statements offered in evidence should not be given to the public. The day is past, or ought to be, when local inspectors can get behind closed doors and deal with cases involving, perhaps, their own competency. Any inquiry or examination carried on in a public office wherein the rights, privileges and safety of the public are concerned cannot be carried on too openly and above board.

THE cost of the United States mail service between San Francisco and Australia is defrayed chiefly by the government although the service is performed by an American line of steamers with the aid of one British steamship, the employment of which is obligatory under the contract with the New Zealand government, which pays most of the cost. This contract expires in November 1892, and there is almost a certainty that the service will be abandoned unless the postoffice department of the United States bears a reasonable share of the cost of maintaining it. The San Francisco Chamber of Commerce has passed a resolution urging congress to appropriate such a sum as will insure continuance of the American mail service to Australia, by paying a proportion of the cost of such mail transportation, which ought to have been done long ago.

THE CANAL TOLLS QUESTION.

The canal tolls question has now reached that stage where the utmost consideration is necessary before official proclamations are issued. A retaliatory war in canal tolls, or the right of way over the connecting waters of the Great Lakes should be avoided until every other means of obtaining mutual concessions are exhausted. Recriminations, arbitrary rulings, or national prejudices ought not to be allowed to gain a supremacy in these important questions of international commerce over the artificial highways of the lakes, as if so, the friction would not long exist before the natural highways would be affected by the same spirit.

BRIDGING HARBORS.

The action of the Duluth City council in authorizing the construction of a bridge in St. Louis Bay is detrimental to the present and future interests of the lake marine, nor should a pile be driven there until the entire question had again been gone over by a competent commission appointed by the Secretary of War.

Let it be clearly understood that the commerce of the Great Lakes and the means for transporting same is still in its infancy. Only a decade ago a man would have been placed under physical and mental restraint for even attempting to order the construction of a 380 feet steel steamer for lake business, yet such a contract has been closed within the past 48 hours.

Those who have been closely identified with the lake marine during the past quarter of a century partly realize the stupendous advancement, but, it is entirely beyond the comprehension of the men of to-day to grasp the situation in the enormity of its increase, and it is with a view to the future as well as the present that artificial obstructions should be authorized by those into whose care the nation at large entrusts the conservancy, protection and improvement of our waterways.

A few years ago Duluth harbor might have been turned into a veritable dumping ground, pile driving, boat-houses, arches, bridges, in fact elevated railroads could have been thrown across the bay without a restraining influence, not so to-day, and further, the time's near at hand when jealous eyes will watch the deposit from a vessel of even the smallest weight of solids which is likely to affect the draft of water, and marine interests, present and future, need to be thankful that the argus like eyes of the corps of engineers U. S. A. are ever on the watch and alert to conserve the waterways within their jurisdiction. The chief of engineers and his highly trained staff has never permitted private aggression to interfere with the Federal rights and under the Secretary of War no despoiling of maritime rights has ever obtained, with such a record in high places the marine interests may feel assured that justice, equity and a due regard for the future will be strictly ruled upon and maintained on the production of inclusive evidence showing the righteous interests involved by their decisions.

LAKE CHARTS.

It has been pointed out time and again in these columns that the charts of the Great Lakes published by the United States Government are far inferior to the charts issued by other maritime nations, in fact, a large number, perhaps the majority of experienced masters and pilots prefer sending to Canada and obtaining, even at a much greater cost, the lake charts issued by the Dominion Government. Little dependence can be placed upon the survey from which the charts were first issued, as an entire change of the contour of the bottom has taken place in many localities, nor can this be wondered at when the original survey of some portions date back to 1857, yet, not alone are the charts obsolete for certain sections, but the paper on which the charts are printed is just as inferior as the work contained on them, and unless they are linen backed after purchase they are voted a constant annoyance. In the re-construction of the graduation it would also be of vast importance to the lake seamen to have the charts drawn on the Mercator projection, so that the meridians would be at equal distances from each other and the parallels at right angles thereto, the ship's course between any two places would then be represented by a straight line, making the same angle with each meridian. The Mercator projection is without doubt the one best known and adapted to the wants of the seaman, especially if the art of the engraver is not used too sparingly. Another feature of great importance is the table of magnetic variations as now printed on lake charts, these are inaccurate, and therefore misleading when it is desired to obtain a magnetic course, or in converting a magnetic course or bearing to a true one, each master has now to constitute himself a scientific committee of one to determine by amplitudes, azimuths and known bearings, the amount of variation over the ground he traverses during the season, as even the latest survey is said to be in error on Lake Superior.

Gen. O. M. Poe, Corps of Engineers, U. S. A., is the earnest and learned official with whom the lake-faring community rest their claims for improvements in this direction and the subject is fully gone into in his annual report to the chief of engineers, the result of which it is to be hoped will be to furnish the lake marine modern charts of the highest style known to the art, and on the Mercator projection.

A BILL has been formally reported on by the committee in charge in Congress, making it unlawful for any common carrier to insert in any bill of lading or shipping document any clause whereby the carrier shall be relieved from responsibility for loss or damage arising from negligence or failure in proper loading of merchandise committed to their charge, nor shall it be lawful to limit its liability for less than the full value of any article lost or damaged.

TRIAL TRIP OF THE CODORUS.

The new Anchor line steamer Codorus, built by the Union Dry Dock Co., for the Anchor Line, has been given a trial trip and the results were most satisfactory both to builders and owners. The Codorus will carry fully 3,000 tons dead weight on a draft of 16 feet, her engines are triple expansion, cylinders 20, 33 and 54 by 45 inch stroke, the boilers are 14 feet in diameter by 12 feet long, fitted with six furnaces 44 inches in diameter, and tested for 160 pounds, and will steam with 1,230 I. H. P. 13¼ miles loaded, and about 15 miles an hour light. On the trial trip the engines worked splendidly up to 81 revolutions per minute, this with a piston speed of over 600 feet per minute may be considered good work. Mr. J. R. Oldham attended the trial trip in his capacity as consulting engineer to the owners, and expressed himself to your correspondent as being well pleased with the test. The Codorus is fitted with the "Providence" steam windlass and capstans furnished by the American Ship Windlass Co., Providence, R. I., the Williamson steam steerer, Lamont's purifiers and feed heaters and other standard equipments. The Codorus is now ready for business and will be placed on the Chicago-Buffalo route.

CONTRACT FOR A LARGE STEEL STEAMER.

A contract was closed on Wednesday morning between the Hawgood & Avery Transit Co., Cleveland, O., and F W. Wheeler & Co., W. Bay City, Mich., for a steel steamer of the following dimensions: 377 feet 6 inches over all, 360 feet keel, 45 feet beam, and 25 depth of hold.

The competition for the construction of this vessel, the largest on fresh water, was very brisk, and although it was prematurely reported that F. W. Wheeler & Co. had secured the contract no papers were signed until Wednesday, when the competing builders were notified of the contract being closed. The Hawgood & Avery Transit Co. are the first to anticipate, in a practical way, the deep water channel authorized by Congress, and the new steamer will simply knock all previous cargo carrying records endwise in bringing along 5,000 tons on a 19 feet draft. Her machinery and equipment is also to be of the best, and every modern facility for handling ship and cargo will be put on board of her.

AN INTERNATIONAL CLASSIFICATION FOR LAKE TONNAGE.

The "Bureau Veritas," which is, perhaps, the most perfect system of rating and classification of vessels, and has agencies all over the world, being international in its scope, has decided to take up the inspection and rating of lake hulls, realizing, no doubt, the importance of the lake merchant marine.

Capt. F. D. Herriman, a native of Maine, but who for years has been at the head of the great ship-building firm of Herriman & Co., Liverpool, has been appointed to the responsible position of manager of the new department, and will make his head-quarters at Chicago. Capt. Herriman, on his arrival on the lakes, will look the field over and establish agencies at the principal American and Canadian ports.

PROTESTS AGAINST HARBOR OBSTRUCTIONS.

At a meeting of the Finance Committee of the Lake Carriers Association, held in Cleveland on Monday, the following resolution was passed by a unanimous vote:

Resolved, That the secretary be instructed to send a communication to the Secretary of War calling attention to the proposed erection of a bridge across St. Louis Bay or St. Louis River, Minn., from Rice's Point to Connor's Point, or in that locality, and requesting that necessary action be taken by the department to prevent the erection there of any unreasonable impediment or obstruction to navigation.

THE WHALEBACK DISCUSSION.

The recent comparisons made between the whalebacks and other lake tonnage has brought about considerable feeling and we present the following letter on the subject:

JOSEPH R. OLDHAM, C. E.,
Naval Architect—Inspector and Valuer.
Lloyd's Agent—Late Surveyor to the
Liverpool Underwriters, Inland Lloyd's etc.
CLEVELAND, O., July 18th, 1892.

J. F. Pankhurst, Esq.,
Vice President and General Manager
Globe Iron Works Company, Cleveland, O.

DEAR SIR—I am obliged to you for drawing my attention to an illustrated article on the "Whalebacks," in which my name appears. Of course I cannot prevent any person making use of my writings, nor would I desire to do so if such be used in a fair way, and in the present instance I see nothing unfair in the reference to my paper on "Whalebacks," but let me clearly state that I have never made any comparison between these vessels and the "Matoa," need I add that I have had nothing whatever to do with the said article, indeed it appears to me that the writer of it has been misinformed with regard to the performance and general efficiency of the "Matoa."

I know of nothing better as regards strength, carrying capacity, speed, accommodation and in economical arrangements for the handling of freight and "steaming" than obtains in that handsome steamer.

Yours truly,
JOSEPH R. OLDHAM.

(*Continued from page five.*)

far the best of the three, which is strenuously denied by Cleveland and Detroit papers Considerable curiosity exists here as to the amount of grain the Codorus will carry. It is claimed she will get away with 100,000 bushels of corn. All three boats will go in the Chicago Buffalo trade.

The steamer Monohansets machinery broke down when off Racine Saturday night rendering her helpless. The steamer Edward Buckley, Captain Charley Gnewuch picked her up and towed her to this port, arriving Sunday evening.

DETROIT NOTES.

Special Correspondence to The Marine Record.

The new yacht Bonita, built by the Detroit Boat Works for Mark and E. W. Hopkins, is one of the finest steam yachts on the lakes. Her dimensions are 125 feet long, 16½ feet beam, and 8½ feet deep. She is flush decked and elegantly fitted out. Her Hodge triple expansion engines are 9¼, 14½ and 24 inches by 14 inch stroke, with a Roberts water tube boiler which gives her easily all the steam required at short notice. She reels off 16 miles per hour steady average and cost about $25,000. The handsome steam launch Dream, just completed to the order of H. H. Taylor, of this city, is 61 feet long, 9 feet beam and 4 feet deep. her engine is a fore and aft compound, cylinders 5½ and 11 by 9. She has a Smith water tube boiler 5 by 5½, and on her trial trip last Sunday reeled off two miles in six minutes, or at the rate of 20 miles per hour. The Detroit Boat Works are also building a set of well finished double ender metallic life boats, they are light, handy and according to the popular design for these class of boats, as every facility of construction is offered I expect that metallic life-boat building will be carried on to a much larger extent than heretofore, and if so, owners will no longer be required to send their orders away from the lakes. The annual output of this well-known boat works now run up into the thousands, and an order for a fleet of one or two score row boats is an ordinary request. Several handsome wood and steel steam yachts, a submarine wonder in wood, and extensive repair contracts note the recent work completed.

A letter from the Inter Ocean Transportation Co. to the Detroit Dry Dock Co. mention the splendid capacity and satisfaction which two of the recently built steamers are giving to their owners. The composite built steamer Manchester, loads regularly and moves along at a high rate of speed 3,000 tons of ore, while the late built steel steamer Maryland slips along with 4,000 tons each trip on schedule time.

James P. Worden, chief engineer of the J. Idlewild is one of the pioneer engineers of the lakes. Nearly half a century ago, in 1844, Mr. Worden started out on his career and eight years later he was appointed chief of the Huron, then trading between Detroit and Saginaw. Our pioneer friend is still well and hearty, has amassed a snug competency, and with his life-long consort enjoys the greater portion of each year in seeking congenial surroundings. All hands will join in wishing Mr. Worden an extended autumn of life to enjoy the fruits of his bye-gone labor.

The railroad transfer ferry steamer building at the upper yards of the Detroit Dry Dock Co., for service in the Straits of Mackinac is now about two-thirds in frame.

George C. Baker has had the old battery of the submarine boat repaired. He intends to take the boat down to Amherstburg, where the water is 30 or 40 feet deep and there give her another trial. Afterwards, if this trial is successful the boat will go to salt water.

The Grummond Line, freight, passenger and towing service is very brisk, and business is found to keep the extensive fleet fullyemployed almost day and night.

The proposal to build a bridge across St. Louis Bay at Duluth is vigorously opposed by all vessel men, an owner remarked here to-day that pile driving across the entrance to a port so that steamers might reeve themselves in through the gaps would probably be next in order, on the plea of making lots of entrances and exits, sounds likely too! tunneling it is thought is the only way to conserve the surface lines while the northwest commerce is in its infancy. It is not what the trade is now, but, what will it be in a decade hence at the present rate of progression?

Captain Alex. Ruelle, has been figuring on building a new tug boat for river and lake service. The Craig Ship Building Co., and others have submitted bids for the construction.

J. C. Goss & Co., have just put in a plant for manufacturing steam pipe and boiler covering. The patent is used very extensively east, is economical and very durable, and the State rights purchased by the above firm will be closely worked and guarded.

Mr. A. A. Parker and Mr. Candler, left this port Tuesday night for Cleveland.

DULUTH, MINN.

Special Correspondence to The Marine Record.

Wheat stocks at the head of the lake remain about as last week, with receipts of 560,000 bushels, and shipments of about the same. There are now 3,400,000 bushels here, and receipts will probably continue fair till the new crop moves. Flour stocks are in the same condition, last week showing receipts of 121,000 bbls. and shipments of 122,-000. Local production was only 20,000 bbls., the Imperial mill having broken a shaft, delaying it considerably. Under ordinary circumstances, it alone should be grinding 30,000 bbls. a week. The new Freeman mill at Superior was started up some time ago, but is not proving a success so far, and has not yet ground enough flour to become a shipper. There are in all Minnesota and Dakota elevators about 4,000,000 bushels or less than a year ago.

The Farmers' Protection Association, an alliance offshoot of Dakota, has secured a site, and has decided to build an elevator at the head of the lake, if it can raise the funds. The farmers expect that by co-operative management they will be able to realize the old desire of the grain raisers—get more for their wheat. The elevator will be about 750,000 bushels capacity, and will be located on Allowez bay.

It is understood that the Washburn and Pillsbury, of the "Soo" line's fleet, will shortly be followed by two, and, perhaps, more, for the same line, if the first two prove a success. It is not absolutely certain that they will be whalebacks, as vessels of the monitor and straightback type are looked on with favor by officials of the "Soo" road," but whalebacks they are likely to be.

Wheat freights to Buffalo are dull at 3¼ cents, with a large amount of tonnage taken last week at that figure, enough, in fact, to last some time at present rates of shipping.

Mr. B. H. Bronson, observer weather bureau, has been promoted to the grade of local forecast official at this station. His appointment was highly recommended by commercial bodies interested in the navigation of the upper Lakes.

The new tug Corona, built at the Grignon's yard last winter under the supervision of William Osborn for the Duluth Sand and Tile Co., is giving them excellent satisfaction. She dredges about 600 yards of sand a day and deposits it in an Osborn patent scow. The scow is then towed to a dock, where the tug again discharges her. The system is far in advance of anything hitherto used for this purpose, and although Capt. Osborn has worked for several years on the plan, it is now a complete success, and he contemplates building several other plants according to his patents. The captain is also negotiating with parties in Galveston, Texas, to build a plant there of large dimensions. A plentiful supply of sand for building purposes has now become a consideration, and to procure this the Osborn system is the most speedy and economical.

TORONTO, CAN.

Special Correspondence to The Marine Record.

The new excursion steamer A. J. Tymon made her first trip last week, and her owners are to be congratulated on having had a handsome little steamer turned out for them. When her machinery gets down to its bearing she will undoubtedly prove herself a fast boat. Her officers are: Captain, James McSherry; mate, William Foster; engineer, Thomas Good.

The cruiser Curlew arrived from Owen Sound last week, and is the exact counterpart of the Constance that left some weeks ago for Quebec. The Curlew's smokestack was not as large as the specifications called for, and Messrs. Polson & Co. had to put a new one in her here. In going into the wharf she stuck on a mud bank, and it took the united efforts of the tugs Jackman and Merritt to release her, after which she was taken to Church street wharf, and the new stack was shipped. She is officered as follows: Captain, John H. Pratt; first officer, Ernest Kenney; second officer, R .Morris; first engineer, D. Hill; second engineer, A. Brown. She will receive her armament at Quebec or Halifax, and will be used in the fishery service in the Bay of Fundy. She left for Quebec on Thursday.

Commander Gordon, R. N., was in town last week to have a final inspection of the Curlew.

The Arabian, built at Hamilton for Fairgrieve & Son, was launched last Saturday, and will be ready for business about the middle of August. She will trade from Montreal to Port Arthur.

The propeller Acadia, having on board the supplies for the Canadian lighthouses, arrived last Friday. Mr. P. Harty, the General Inspector of Lights, reports that all the lights supplied on Lake Ontario and the River St. Lawrence were found to be in excellent shape. The Acadia had a large number of passengers aboard.

The schooner M. A. Hall, Capt. P. McSherry, arrived on Monday from St. Catherines, where she had been on the dry dock and received a thorough rebuild, new frames, planking, &c., and is now as good as new.

The propeller Persia arrived from Montreal on Sunday night with a full load of freight and passengers. Owing to the low water in the early part of the season Capt. Scott determined to try if the Persia could not come up Rapid de Plat instead of coming through Morrisburg Canal, where his vessel was continually grinding on the bottom. She came up the Rapids all right, and has done so every trip this season, although now carrying full loads. Capt. Scott says he feels disgusted with himself to think he has been subjected to the annoyance of low water in Morrisburg Canal for years when he could have come up the Rapids and saved a great deal of labor and a very considerable amount of wear and tear to his vessel's bottom.

At the present time when the question of alleged discrimination by Canada against United States vessels in the use of the Canadian Canals is being discussed, the appendix to the annual report of the Minister of Railways and Canals, containing the canal statistics for the past year, is of great interest. The total revenue for the year was $350,351, an increase of $2,292 over 1890. There was refunded on grain in 1890 toll to the amount of $41,635, and in 1891, $49,834. The latter figures represent 276,861 tons of grain which passed down the Welland Canal and were transhipped at Canadian ports to Montreal and upon which a rebate of 18 cents a ton was made. The total quantity of grain which passed down the Welland Canal to Montreal was 295,509 tons as against 228,513 in the previous year. The quantity on which full tolls were paid shipped from one U. S. port to another U. S. port shows a decrease from 245,932 to 202,710. The inference being, judging from the figures already given, that a large amount of traffic has been diverted to the St. Lawrence route. The bill passed by the U. S. Congress authorizing the levying of tolls upon Canadian vessels passing through the Sault Canal is causing a great deal of discussion among the owners of Canadian floating property. It will be a very serious blow to their interests, but they still maintain that the Canadian Government is quite right in the position they have taken in regard to the Welland Canal and hope that they will not back down from it. If the bill is signed by the President it means that a great number of Canadian steamers will have to lie up until the canal at the Canadian Sault is finished, or seek other trade.

Mr. W. J. Meneilley, chairman of the Board of Steamboat Inspection, returned to Ottawa on Monday, after a four months tour in connection with the work of his office under the act of last session. The board has been engaged recently in drafting new rules and regulations with regard to the use of boats, buckets, life preservers and life saving apparatus on steamboats. The act will go into effect about August 1st, and the new regulations will be promulgated almost simultaneously.

SPARTA.

BUFFALO, N. Y.

Special Correspondence of The Marine Record.

Hand & Johnson's new tug has been lauched and will soon be ready for service. She is the largest and most powerful tug in the harbor.

Attorneys Cook and Fitzgerald have libeled three boats since last Saturday. The first being the schooner J. T. Mott for a tow bill of $85. Monday the United States marshall tied up the Canadian barge A. H. Jennie, on a libel for $1,055.60 for seamen's wages, and Tuesday, a peculiar libel was filed against the whaleback steamer E. B. Bartlett. As the steamer was passing the Evans slip, she discharged a heavy blast of steam from one of her pipes, which severely scalded Capt. Pat Hines and his wife, who were sitting on the deck of the steam canal boat E. A. Culver. The Bartlett got away, but papers will be served when she returns on her next trip.

The new whaleback steamer Washburn came in Monday on her maiden trip. Her cabin furnishings and fittings are said to be the finest of any freight steamer on the lakes. She is painted black instead of oxide like the other whalebacks which have been seen here, and presents a better appearance. When loaded with 3,000 tons of freight the Washburn's package freight hatches are but a few inches above the water line.

Capt. Woods, of the steamer Madeleine T. Downing, who reported seeing a sea serpent in Lake Erie last week, had to stand a deal of chaffing from the local mariners when he arrived here. To your correspondent he solemnly averred that he and his first mate did see a reptile which appeared to be about 40 feet long and as big around as a man's body. The snake's head was above the water and looked to be about three feet across. Capt. Wood swears he was near enough to see the creature's eyes.

Capt. Abner Gilbert, of the excursion steamer Pilgrim, has been exonerated from all blame in the Dixie collision. Charges of drunkenness against Capt. Harbrecht, of the Dixie, are now being officially investigated.

Capt. Napier, of the tug Townsend Davis, by prompt action saved the lives of four young men who went sailing Sunday night. Their yacht capsized and two of the men were nearly gone when the tug reached them.

Last Sunday the lumber laden barge Ketchum took a sheer while going down Niagara River and struck the water works pier with her stern. On reaching Tonawanda the barge was found to have five feet of water in her hold.

The union lumber shovers are causing vessel owners much trouble. They made a scale of prices for unloading, but do not live up to it, or rather they do live over it, for when a boat is in a hurry they slap on prices higher than the scale. Three members, including the president, made different contracts for unloading the schooner John B. Merrill. The scale down there is 23 and 25 cents. The union finally refused to unload the boat unless 28 and 30 cents were paid. They got the job and were then evidently ashamed of their conduct, for they rebated one cent a thousand. The union has no executive head whose decision in matters of this kind is final, and it looks as though their organization would finally collapse.

Coal freights for the week have been steady and moderately active at the old rates. The movement for 26 days of this month is 50,000 tons greater that for the whole month of July, 1891. Business on the Erie Canal is at a standstill and many canal boatmen have tied up their boats and gone to work on farms.

Capt. P. J. Kenney, of the steamer Florida, is ill and will stay in Buffalo until he recovers. Mate McAdam will sail the Florida, meanwhile.

THE LOCAL FREIGHT SITUATION.

The 70 cent Escanaba rate has gone to the 75 cent notch since our last issue, though it took considerable forcing to place it there. The Lake Superior rates are firm but unchanged. The wheat rate from Duluth is still at 3¼ cents and large consignments have been placed at that figure, the Chicago rate has again dropped to 2 cents on wheat and 1¼ cents on corn. The coal rate is 60 cents to Chicago and Milwaukee, 35 cents to Duluth, and recent charters were closed for Manitowoc 50 cents, Gladstone 40 cents. Chartering has been somewhat dull during the week.

GRAIN SHORTAGE.

The Duluth "Tribune", in commenting on the shortages of Duluth grain cargoes at Buffalo, says:

Nearly every cargo that has left Elevators E and D has been found short at the Buffalo end, but occasionaly a cargo is fouad with an overage. The whalebacks have almost invariably been short, an fact nearly every cargo that leaves the head of Lake Superior and is discharged at Buffalo is found in an unsatisfactory condition. Of course the vessels have to stand the losses, though it is quite plain that the fault can hardly be laid to them. The elevator companies at either end of lakes charge the other with unreliable scales, and there the matter rests. So long as the boats continue to pay these losses there would probably be nothing done, but vesselmen have at last become tired, and in a quiet way the elevator companies here are having their scales inspected. Yesterday the scales at B and D were officially inspected and pronounced to be all right by the inspector from St. Paul. Elevator E will be inspected today. It looks very much as if the Buffalo folks would be forced into doing something to raise the cloud of suspicion that can be seen hanging over their elevators by every grain carrier on the lakes."

The Duluth scales may be right now that they are inspected but does it not strike Duluth people as quite singular that no series shortcomings have occurred on vessels loading grain for Buffalo from any other port but Duluth?

The Buffalo "Enquirer".

VANDERBILT'S YACHT SUNK-

While at anchor in the fog on Nantucket shoals on Sunday morning W. K. Vanderbilt's yacht Alva was run into and sunk by the steamer H. F. Dimock. All on board the Alva, including W. K. Vanderbilt and party, were saved and taken on board the Dimock.

The Alva, as Mr. Vanderbilt stated in a letter at the time of her launching, was not built for speed. Safety and comfort were the first requirements. She was a floating palace and yachtsmen pronounced her the first vessel of the kind ever constructed in this country. Money had been expended lavishly by her owner and it is sufficient to say that he was fully satisfied with his vessel. She was a screw steamer with barkentine rig, 285 feet over all, 252 feet on the water line, and 32.3 feet beam. The engine was a three cylinder compound direct acting type A powerful dynamo engine supplied with steam steering gear and a steam windlass. She was built by Harlan & Hollingsworth at Wilmington, Del., in 1886. Her designer was St. Clair Byrne of Liverpool, England.

The Alva was one of the largest and finest pleasure steamers afloat and cost her owner nearly $500,000. The sunken vessel rests on a sandy bottom and divers will be at once set to work to raise her.

CAPTAIN FRANK HEATH, the ordnance officer in charge of the proving ground at Sandy Hook, in a report on the accidental hitting of the schooner Henry R. Tilton by a shot from a ten-inch rifle during the tests on July 9, says that no blame can be attached to any one for the accident, which was clearly unavoidable. The United States will pay for the damage to the schooner, but as there is a lack of available funds the matter will probably be adjusted through the court of claims. Referring to the renewal of complaints against the location of the proving grounds at Sandy Hook, caused by this accident, Gen. Flagler said that the Government is likely to continue to test its guns at the Hook until a better place can be provided, and that such a place has not yet been discovered.

WORK has been resumed on the Chignecto Ship Railway, and it is expected that in about a year the practicability of the ship railway idea will be a subject of demonstration. This railway is to be 17 miles long, connecting the Bay of Fundy with the Gulf of St. Lawrence. Ships of 1,000 tons register, with maximum measurements of 235 feet length, 56 feet width and 15 feet draught and 2,000 tons displacement will be accommodated.

THE sea serpent has now been seen in Lake Erie. He probably wanted to see if fresh water sailors were afflicted in any way like salt water shell backs. Or perhaps he preferred a change of waters and has gone inland for his health.—"Maritime Register."

Possibly he is getting fresh as he grows old.

ELECTRIC LIGHTING IN NEW YORK.

[ILLUSTRATED.]

The beautiful exhibit at Madison Square Garden. New York, during the recent Actor's Fund Fair, of the novel developments in electric lighting by means of new small lamps, formed the initiative and experimental effort on a grand scale of a new department of the General Electric Company, the Sign and Decorative Lamp Department.

The adaptability of the electric incandescent light to ornamental sign work was considered as fully proved by the success encountered at the Actor's Fund Fair, and the President of the Long Island Railroad, Mr. Corbin, while viewing the many pretty effects obtained, decided to have a sign of his own, and commissioned the new department to realize his ideas.

On the corner block on 23rd street, formed by the confluence of Broadway and Fifth Ave., stands a small building behind which rises a huge overtowering construction, nine stories high exposing a plentiful surface of blank wall over the top of its dwarf neighbors. This surface, 60 feet wide by 68 feet high has for the past few evenings been the cynosure of the eyes of everybody coming down Broadway or Fifth Avenue, or walking east or west along 23rd street. Upon the surface of this wall is erected perhaps the largest illuminated sign in the world, and certainly the largest and most conspicuous electrically illuminated sign. By means of this sign, Mr. Corbin brings on these hot days, to the attention of a sweltering public the fact that the Coney Island of the well-to-do Manhattan Beach, is swept by ocean breezes, and emphasizes the various other special attractions to be found at that well known pleasure resort.

In this sign, there are 107 letters, some 6 feet, some 4 feet and some 3 feet high, each one of which is, in reality, a box of galvanized iron. In the interior of these boxes, arranged in the outline of the letters, are a number of small Edison porcelain series plug cut-outs which are here used as lamp receptacles. At the lower end of each letter is a small sliding door, giving access to a plug cut-out which serves to protect the lamps in that letter. Each letter is suspended and clasped top and bottom to two iron rods formed of strong steam piping, which are securely attached to the wall by expansion bolts.

The illumination of the sign is obtained by the use of no less than 1457, 16 c. p. Edison lamps of different colors, white frosted, red, blue and green. The current is taken from the mains of the Edison Electric Illuminating Company. There are seven sentences, each of which is on a separate and distinct circuit, controlled by a lever switch. The switches are arranged temporarily on a rough wooden frame, and as the primary object of the sign is to keep the different sentences constantly appearing and vanishing, the operator is in a state of constant agitation from dusk until 11 o'clock at night, when all the circuits are open and the brilliancy extinguished. It is a strange fact, but true, that, so long as the charges are being rung, the public is attracted and stands agape, watching the sign, but as soon as the whole seven sentences are lighted and allowed to remain so, the people move on their way and the crowd disperses.

From the switch-board, along the roof of the smaller building, the line is lead to the base of the wall, whence the different wires shoot up into the air to their respective sentences.

At the end of each line is a small platform and between each line a long rod of bicycle steel, each fastened securely to the wall, as are the letter supports, by expansion bolts. A flying ladder 8 feet long, with small wheels fits top and bottom to two of these rods and enables the attendant to run himself along each line and replace any broken or burnt out lamps or blown fuses, in a very few minutes.

As an additional protection to the wires outside, they are run through conduit tubes thoroughly taped at their junctures, and are carried up the wall on porcelain insulators.

The great difficulty with this sign, as in the case of all outside electric lighting work, lay in preventing the deleterious effects of rain and moisture. This has been overcome by fastening to the galvanized iron box letter covers over each hole through which the lamps are thrust into the receptables, small pent houses of iron which project out over the lamps and carry off the rain, without interfering in any way with the effect of the sign. Any rain which might collect on the lamp surface is prevented from running down into the receptable by a small projecting brass ring, fastened to the outside of the lamp near the screw shell.

Each sentence is painted a different color, so that during the day the only thing lacking is the brilliancy of the illumination.

The entire work on this was completed in about 50 days. It was signed by and constructed under the supervision of Mr. F. R. Upton, Mr. A. D Page and Mr. McAllister, of the lamp works of the General Electric Co., Mr. Corbin having practically given them *carte blanche*.

This illuminated sign is not only a commercial success, but when all the lamps are lighted is really a thing of glory. Its splendor is visible from far away up town, and its glow on the sky can easily be seen from the East and North Rivers.

It is an immense step forward in the evolution of the electric light and its application to commercially advantageous uses.

WRECKING COURTESIES.

In reply to an official communication received at Ottawa, from Washington, recently, inquiring whether it was understood by the Canadian authorities that under the terms of the bill passed by the House of Commons last session the principles of reciprocity in wrecking and towing extended to the canal system, the Canadian Government has informed the Washington officials that so far as concerned towing incidental to salvage, the priciple would extend to the canals.

U. S. ENGINEER OF THE TENTH DISTRICT.

Colonel Jared B. Smith, United States Engineer of the Tenth district, stationed at Cleveland, O., is in charge of the aids to navigation of the American shores of the St. Lawrence river, Lake Erie, and including Grassy Island on the Detroit River.

In the District are 71 light-houses and beacon lights, 7 fog signals and 170 buoys, all of which are attended to by Inspector Commander Edwin T. Woodward, U. S. N., who inspects each aid personally in the light-house tender Haze, John Baxter, master, the coast-line covering over 600 miles.

Colonel Jared B. Smith will, in a few weeks, make special surveys at Cleveland harbor, also Conneaut, Sandusky, Maumee Bay, and also at several other places.

With the $100,000 appropriated by Congress for Cleveland harbor the engineer states that he will reserve $25,000 for dredging, repairs on the breakwater, and other necessary outlays next spring, and that $75,000 will be expended on the extension of the eastern arm of the breakwater.

The sum of $40,000 appropriated for Conneaut is totally inadequate to make a good port at that place, and the Engineer finds that the river there turns at a sharp angle near the shore, and a channel straight out to the lake must be made. The money appropriated will be sufficient to construct two short or one long pier, over what is now dry land, so far as its availability for navigation purposes is concerned. But this is all that can be done, because if the money should be expended in dredging, the channel would fill up in a very short time, and there would be nothing to show for the $40,000, so that it will be a few years, at best, before Conneaut can become a port worthy the name."

At Sandusky, the money appropriated will be spent on the new straight channel, and this will relieve the Lighthouse Board "of the cost of maintaining three rather expensive range lights, which can then be discontinued. Two ranges will have to be established on shore, but these can be kept up at comparatively small cost."

The Toledo appropriation is also to be expended on the straight channel through Maumee Bay from the mouth of the Maumee river to Lake Erie. The appropriations for the other ports will be used for building piers and for carrying on improvements already begun, and to which Colonel Smith is giving every possible care and attention.

THE Bell Lewis & Yates Coal Mining Co. has extended the ropes of the Rochester mile haulage plant until now there is 12,000 feet of haulage and 24,000 feet of tail rope running on one set of drums. This makes a distance of over two miles the mine cars travel in coming out, while the usual speed of about eight miles an hour is kept up the entire distance. A train of thirty-five cars holding nearly four tons of coal each is brought out each trip.

GEN. POE'S ANNUAL REPORT.

Gen. O. M. Poe, colonel of the Corps of Engineers and brevet brigadier-general of the United States army, has completed and forwarded to Washington his annual report on coast survey matters for the district in his charge. It will be gratifying to the lake marine to learn that the report deals fully with the subject of lake surveys and the issuing of the "latest and best" charts.

The general's report bristles with pertinent truths and in advocating re-surveys it states that in view of the great importance of this work to the lake marine, an estimate of $50,000 for "surveys and other expenses connected with correcting and extending the charts of the northern and northwestern lakes," during the fiscal year ending June 30, 1894, in addition to an estimate of $3,000 for "printing and issuing charts for the use of navigators and electrotyping copper plates for chart printing," is submitted, in full confidence that the conditions now existing amply warrant this expenditure.

These projects or something of a similar nature will have to be carried out if the charts are to be rendered of the greatest service to navigators. The work already done, particularly in the location of the dangerous shoals in Lake Erie above referred to, has fully demonstrated the necessity which exists for work of this character. The lake marine is of too great importance to the country at large for any effort looking towards its safety to be spared. When the United States Government sells charts to navigators, these charts should embody the latest and most accurate information concerning the localities to which they refer, and everything should be done to make navigation safe and certain. The commerce passing through St. Mary's River now amounts to 9,000,000 tons of freight, and that through the Detroit River to over 20,000,000 tons of freight annually; and this commerce is increasing with great rapidity. Interests of such magnitude require that no stone shall be left unturned for their protection.

Navigation of the lakes is attended with peculiar dangers, similar in kind but far different in degree, to those met with on the ocean. On the lake, vessels are never far from landand what is worse, have land all around them. Running , before a gale is never to be thought of At certain seasons of the year gales are frequent and severe, and at all times an accurate knowledge of the locations of all dangerous obstructions is essential to safety. Accurate knowledge of this kind can be obtained in but one way, and that is from all the charts. It is essential therefore, that all the charts be kept constantly up to date.

From 1885 up to the opening of navigation in 1892 the lowest water surface of the lakes for the season has been less each year than the year before. This condition, however, is only temporary, and evidences now point to an increase in depths. Combined with this lowering in recent years, however, has been the great growth of the lake vessels, both in size and numbers, a growth that must be seen to be appreciated. Since the original surveys were made the maximum draft of vessels has increased from nine and one-half and twelve feet to sixteen feet and when improvements now in progress are completed it will still further be increased to twenty feet. As a consequence the larger and more expensive vessels are constantly discovering dangers previously unknown, and discovering them by the costly process of striking them. All dangers as discovered should at once be surveyed and located upon the charts in order to prevent the repetition of similar accidents at the same point.

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Chicago Ship Building Company,

STEEL STEAM-SHIP BUILDERS.

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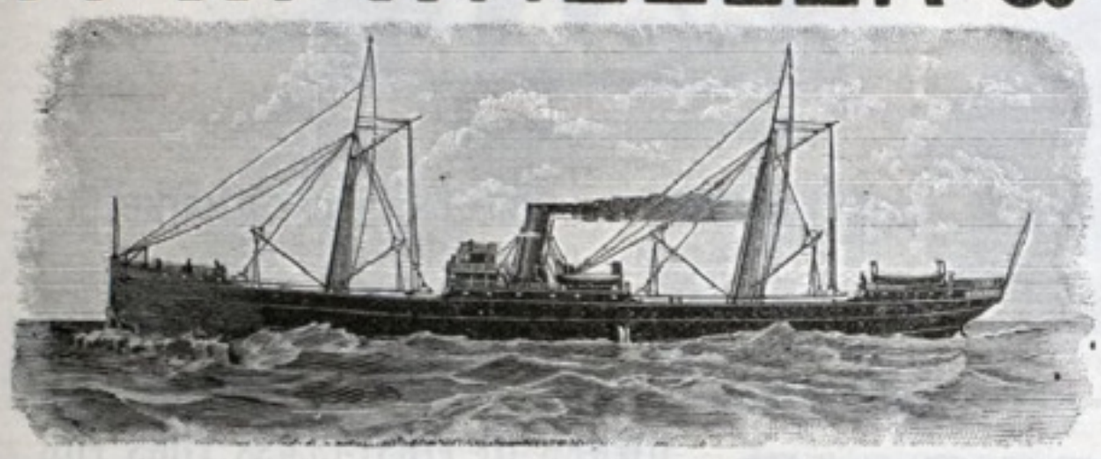
F. W. WHEELER & COMPANY.,



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Daily at 8:30 A.M. to PUT-IN-BAY & RETURN $1.
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Evening Lake Rides every
MONDAY & SATURDAY, 8 P.M.
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GIVING A FULL DAY IN THAT BEAUTIFUL CITY.
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Insures against Marine and Inland Transportation Risks and will issue Policies making Loss Payable in England.
Assets over $10,000,000 for the Security of its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.

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LOSSES PROMPTLY PAID. INSURE IN A STRONG HOME COMPANY. DETROIT, MICH.

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Successors to E. B. HALE & CO., established in 1852.

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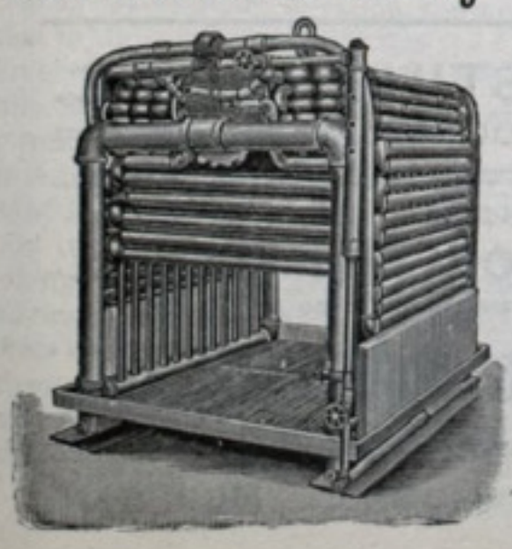
Would be pleased to meet or correspond with any one whose present Banking relations are not entirely satisfactory, or who, for any reason, propose to open a new account.

We promise to make every effort to make our Bank a safe, agreeable and profitable place to do business.

The Roberts Safety Water Tube Marine Boiler,



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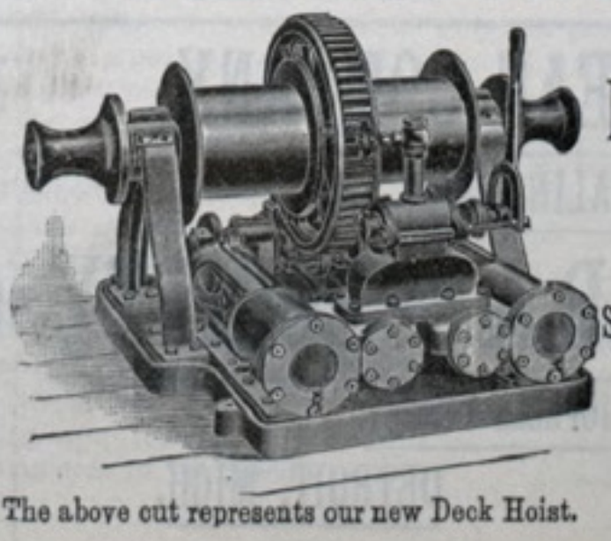
THE ORIGINAL FIXED WATER LINE PIPE BOILER.
"IMITATION THE SINCEREST FLATTERY."
We are collecting royalties from the customers of many infringers.

NEARLY 400 IN USE.

SAFE, RELIABLE, SIMPLE, LIGHT WEIGHT, ECONOMICAL, NO SHOP REPAIRS, SMALL SPACE. Send for ILLUSTRATED PAMPHLET and other reading matter, with huudreds of enthusiastic letters from purchasers and engineers.

The Roberts Safety Water Tube Boiler Co.,
Works covering 1 2000 sq. ft. of ground at RED BANK, N. J.
18 Cortlandt Street, NEW YORK CITY.

PHŒNIX IRON WORKS,



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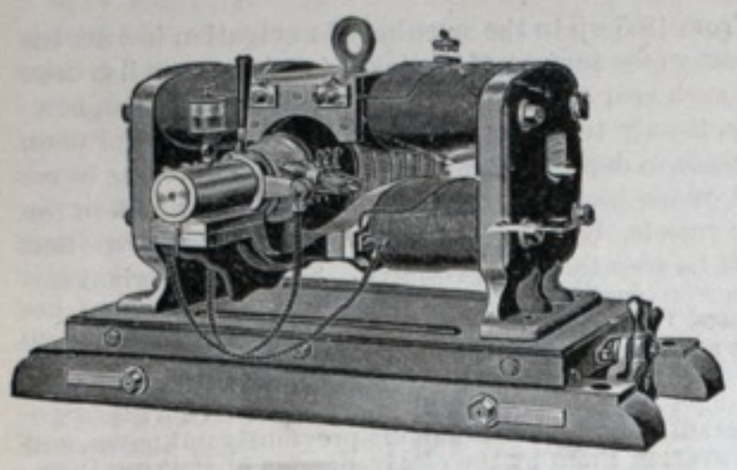

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The slowest speed and most perfectly Automatic Dynamo in the world, therefore

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Signal Work a Specialty. **Ventilating Fans and Motors.**

Steamers already equipped with our Plants: E. C. POPE, MINNIE M., SOO CITY, SAPPHO.

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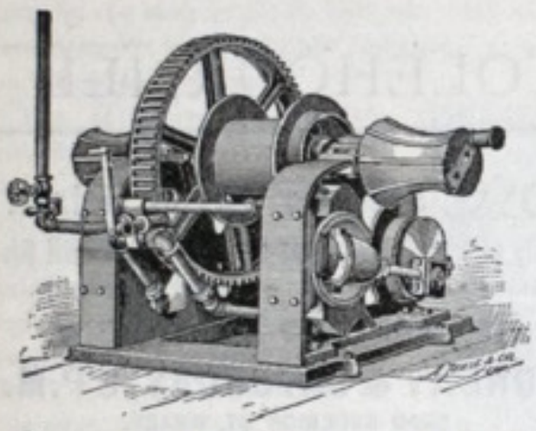

$360.00 DECK HOIST.

Stops, Starts and Reverses with one Lever.

Geared 6 to 1. 2 Cylinders, 3 in. by 6½ in.

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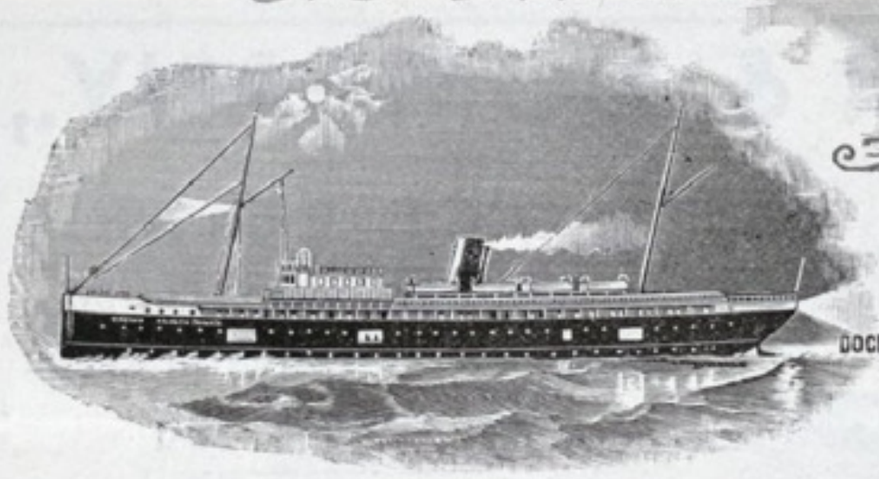

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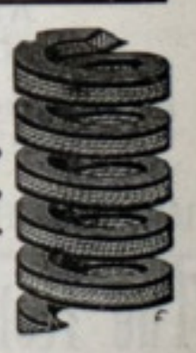

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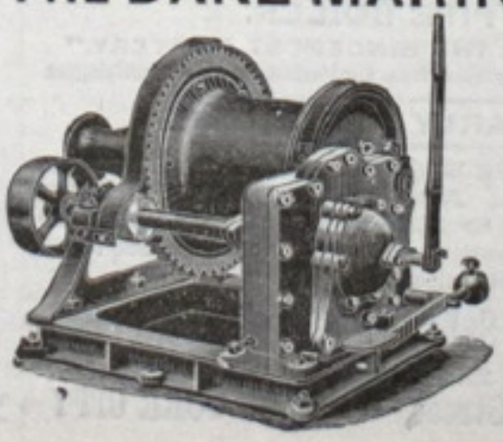

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